Scientific Notation (2)
Do now:

Question 1

A rectangle is 3260 cm long and 1380 cm wide.

(a) Find the perimeter of the rectangle, giving your answer in the form $a \times 10^k$, where $1 \le a < 10$ and $k \in \mathbb{Z}$. [3]

(b) Find the area of the rectangle, giving your answer correct to the nearest thousand square centimetres. [3]

Question 2

Given that $y = \dfrac{6x^3}{2p - q}$.

(a) Find the **exact** value of y when $x = 10.5$, $p = 0.381$ and $q = 0.657$. [2]

(b) Write down your answer to part (a)

    (i) correct to the nearest 1000;

    (ii) correct to three significant figures. [2]

(c) Write your answer to **part (b) (ii)** in the form $a \times 10^k$, where $1 \le a < 10$ and $k \in \mathbb{Z}$. [2]

Task 1

Index Form	Calculation	Number Form
10^6		
	$10 \times 10 \times 10 \times 10 \times 10$	
	$10 \times 10 \times 10 \times 10$	
		1000
10^2		
10^1		
10^0		
10^{-1}	$\frac{1}{10}$	
10^{-2}	$\frac{1}{10 \times 10}$	
10^{-3}		
	$\frac{1}{10 \times 10 \times 10 \times 10}$	
		0.00001

Task 2

Scientific notation	Calculation	Normal Number
3×10^4	$3 \times 10 \times 10 \times 10 \times 10$	30,000
3×10^{-4}	$3 \div 10 \div 10 \div 10 \div 10$	
2×10^{-4}		
7×10^{-3}		
6.2×10^{-5}		
	$2 \div 10$	0.2
		0.008

Using your Graphic Display Calculator (GDC)

(a)	(b)	(c)	(d)
Write 60 000 000 in standard form.	Write 163 000 in standard form.	Write 0.07 in standard form.	Write 0.002945 in standard form.

(e)	(f)	(g)	(h)
Write 6×10^5 as an ordinary number.	Write 7.23×10^6 as an ordinary number.	Write 9×10^{-3} as an ordinary number.	Write 3.92×10^{-5} as an ordinary number.

(i)	(j)	(k)	(l)
Put these numbers in order, smallest to biggest: $8 \times 10^{-2}, 0.076, 87 \times 10^{-3}$	Work out the value of $(7.22 \times 10^6) \div (5 \times 10^{-3})$ Give your answer in standard form.	Work out the value of $(3.2 \times 10^3) \times (8 \times 10^5)$ Give your answer in standard form.	Work out the value of $(9.2 \times 10^{-3}) - (5.6 \times 10^{-5})$ Give your answer in standard form.

(m)	(n)
The diameter of the Sun is $1.4 \times 10^6 \ km$. The diameter of Mars is $6.8 \times 10^3 \ km$. Find the ratio of the diameter of Mars to the diameter of the Sun. Give your answer in the form $1 : n$, where n is rounded to the nearest integer.	The land area of India is $3.29 \times 10^6 \ km$. The land area of Turkey is $7.84 \times 10^5 \ km$. The land area of South Africa is $1.22 \times 10^6 \ km$. Find the mean land area of the three countries, giving your answer in standard form to 3 significant figures.

(a)	(b)	(c)

(a) The table shows the diameter of some planets in the solar system.

Planet	Diameter (km)
Earth	1.3×10^4
Mercury	4.8×10^3
Neptune	4.9×10^4
Saturn	1.2×10^5

(i) Calculate the difference, in km, between the diameter of Earth and the diameter of Saturn. Give your answer in standard form.

(ii) The diameter of Neptune is k times bigger than the diameter of Mercury. Find the value of k to 1 decimal place.

(iii) Find the ratio of the diameter of Saturn to the diameter of Mercury in the form $n : 1$

(b) The table shows the populations of some European countries.

Country	Population
Belgium	1.16×10^7
Estonia	1.33×10^6
Iceland	3.41×10^5
Russia	1.46×10^8

(i) Calculate the total population of these four countries. Give your answer in standard form to 3 significant figures.

(ii) How many more people live in Estonia than live in Iceland? Give your answer in standard form.

(iii) Calculate the ratio of the population of Belgium to the population of Russia. Give your answer in the form $1 : n$, where n is rounded to 1 decimal place.

(c) The table shows the areas in square kilometres of four Asian countries.

Country	Area (km²)
China	9.6×10^6
Hong Kong	1.11×10^3
Japan	3.78×10^5
Pakistan	7.96×10^5

(i) Calculate the total area of China, Japan and Hong Kong. Give your answer in standard form to 3 significant figures.

(ii) Calculate the difference in area between China and Pakistan. Give your answer in standard form.

(iii) The population of Hong Kong is $7.48 \; million$. Find the population density of Hong Kong to the nearest integer, where:

$$Population \; density = Population \div Area$$